Homework #3
Due Tuesday 4/11
(at the beginning of class)

This homework is the sole work of: _____ whose conference section is at: ____

_____whose conference section is at: ____

Sources (People, URL's, Books etc.) consulted:

Source _____ for Problem # _____

Source _____ for Problem # _____

Source _____ for Problem # _____

Date: _____

#1. (5 Points) Section 3.4, #48 a,b. Find these values of Ackerman's Function

a) A(1,0)
d) A(2,2)

Ackerman's function, A(m,n) is defined:

A(m,n) = 2n if m = 0
= 0 if m $\geq$ 1 and n = 0
= 2 if m $\geq$ 1 and n = 1
= A(m-1, A(m,n-1)) if m $\geq$ 1 and n $\geq$ 2

#2. (5 Points) Section 4.1, #32. How many functions are there from the set {1, 2, 3, …,n} (when n is a positive integer) to the set {0,1}.

#3. A computer password consists of from 1 to 3 letters chosen from the 26 letters in the alphabet (repetitions allowed). How many passwords are possible?

#4. Show that if *f* is a function from S → T where S and T are finite sets with |S| > |T|, then there are elements s_1 and s_2 with

$f(s_1) = f(s_2)$

i.e., f is not 1-1

#5. Section 4.2, #18 Suppose there are 9 students in a discrete math class (can't be WPI!).

a) **Show that the class must have at least 5 male students or at least 5 female students.**

b) **Show that the class must have at least 3 male students or at least 7 female students**

#6.

Let S = {1, 2, 3, 4, 5}

a) **How many 3-permutations of S are there? List 5 of them.**

b) **How many 3-combinations of S are there? List 5 of them.**

#7. How many ways can 3 of the letters in the word ALGORITHM be selected and written in a row?

#8. How many 8-bit binary strings have exactly three 1's?